June 16, 1942. V. J. BURNELLI 2,286,341

AIRPLANE FRONT GUNNERY MEANS

Filed May 31, 1938 2 Sheets-Sheet 1

Fig. 1

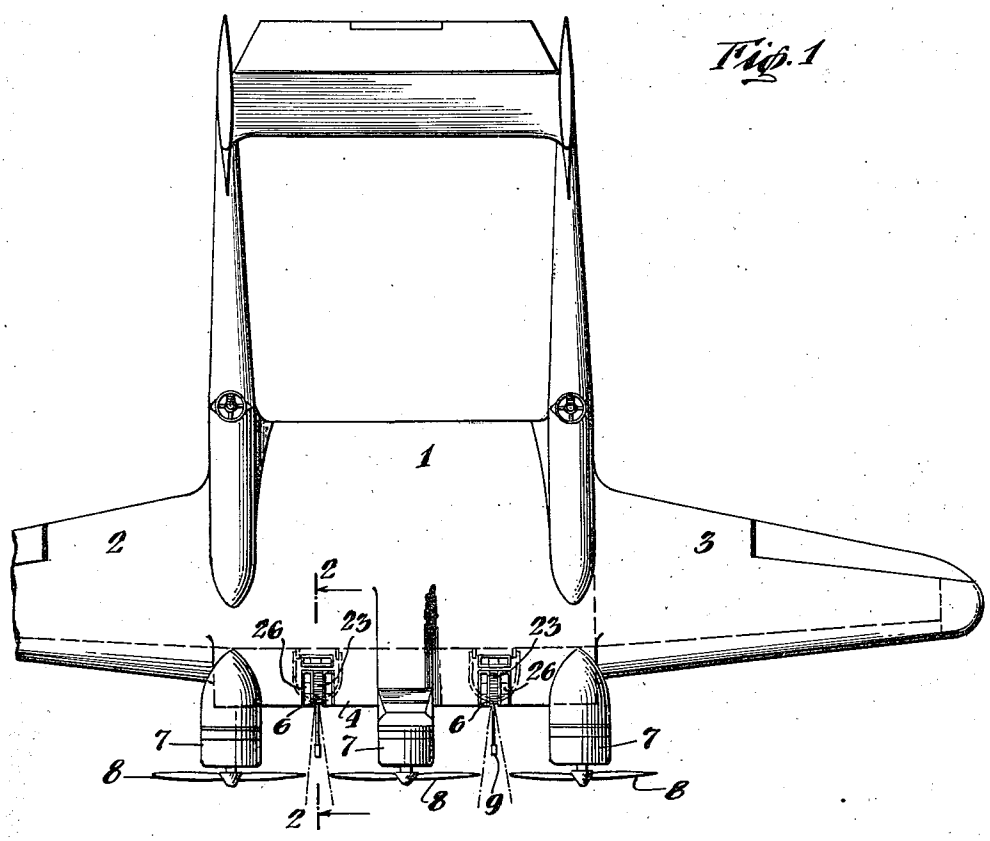


Fig. 4

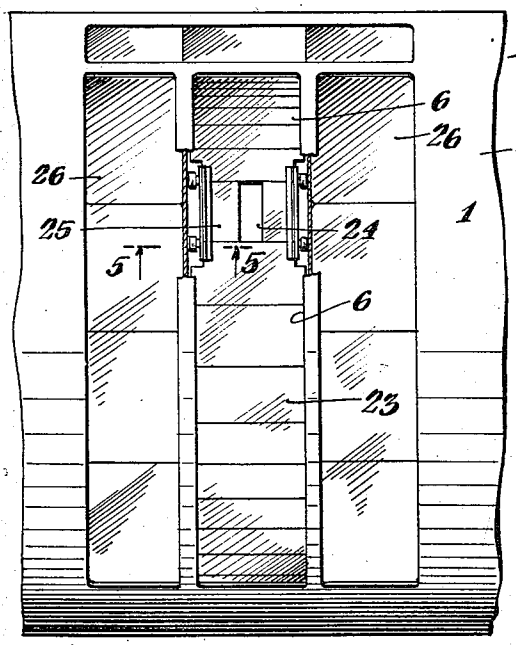
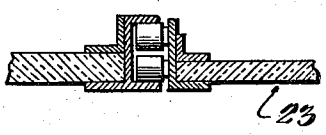


Fig. 5



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Filed May 31, 1938 2 Sheets-Sheet 2

Fig. 3

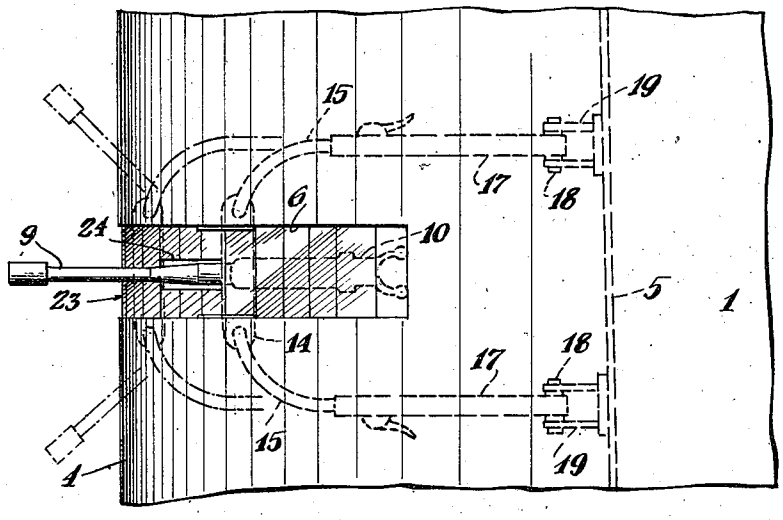
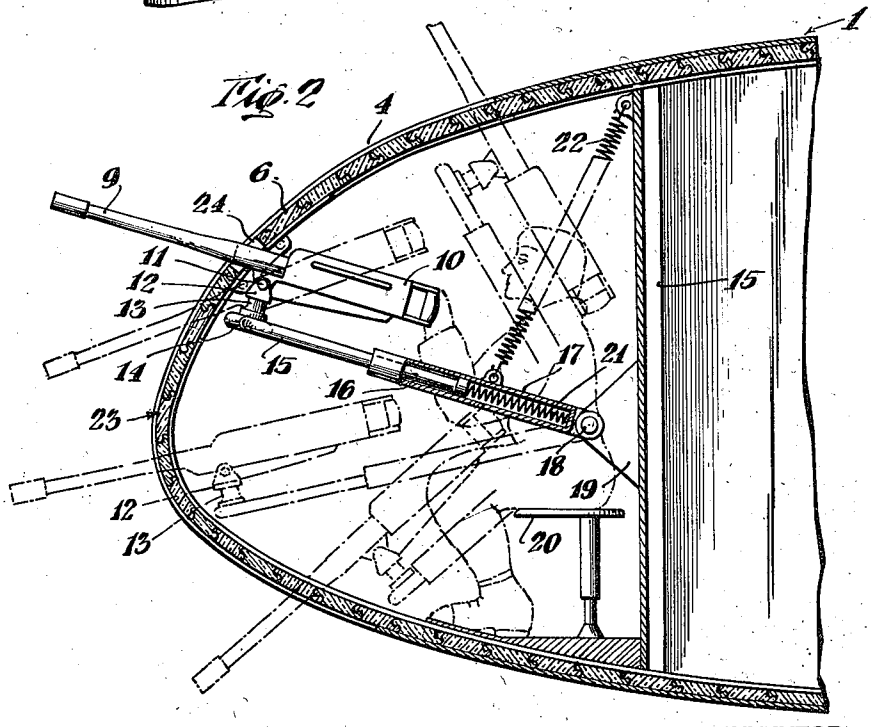


Fig. 2



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AIRPLANE FRONT GUNNERY MEANS

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Application May 31, 1938, Serial No. 210,895

5 Claims. (Cl. 89—37.5)

In all-wing airplanes intended for military purposes the problem of front gunnery involves consideration and it is important with high speed craft to avoid the use of such excrescent devices as forward nacelle or turret housings for the gun and gunner since their employment has the effect of presenting a degree of head resistance and weight addition such as to retard the performance of the airplane.

The high aerodynamic efficiency of the Burnelli type or all-wing airplane resides in the freedom of its wing surfaces from disturbed air flow void of non-lifting resistance, and the main object of the present invention is to provide means, entirely enclosed within the leading edge of a wing section, for containing guns and gunners, with the gun barrels only projecting out through vertical slots in the wing entering edge.

In plural motored airplanes a gun is arranged and mounted in manner to shoot straight ahead through the clearance existing between the proximate points of adjacent propeller disks, having a lateral gun fire range limited by the spread allowed between the gun muzzle and said disks, but this range increasing as the gun is tilted vertically, cam means, such as are known in the art, controlling the gun movement so that the gun fire will clear the propeller blades in all its increasing degrees of lateral range as the gun is moved vertically. The gun has gimbal swiveling means, located in close proximity to the wing nose skin, to facilitate maximum directional aim, both laterally and vertically, and the gun is movable axially that it may follow closely against the skin of the nose in the irregular arc formed by the leading edge of a conventional airfoil.

Each slot is fitted with a transparent covering that is adapted to ride or slide in guideways provided therefor in the wing nose shell, and the gun barrel that projects through the slot is held within said covering, so that the vertical movement of the gun is communicated to the slidable covering, either by manual or power operation.

Other features and advantages of my invention will hereinafter appear.

In the drawings:

Figure 1 is a top plan view of a three motored, all-wing airplane provided with front gunnery means, arranged for the fire angles of the guns to cross about 200 feet forward of the airplane.

Fig. 2 is an enlarged section taken on the line 2—2 of Fig. 1.

Fig. 3 is a partial plan view showing the gun mount, with gun and the slidable slot cover.

Fig. 4 is a front view of the airplane nose, having the gun slot and its transparent slidable cover, and

Fig. 5 is an enlarged section taken on the line 5—5 of Fig. 4.

In this application I have shown my improved front gunnery means as applied to a Burnelli type, all-wing airplane having three motors, each with a propeller, and guns housed within the leading edge of the wing, located at opposite sides of the pilot's cockpit, and each gun adapted to direct its fire through the clearance between adjacent propellers, which permits increased angle of fire as a gun is moved vertically.

Obviously the principle of gun fire from within an airfoil applies to various types of all-wing airplanes of tractor or pusher type.

In the example of my invention illustrated herewith let 1 indicate the central airfoil or fuselage portion of an all-wing airplane, and 2, 3 the respective lateral airfoil portions thereof.

The leading edge or nose portion of the airplane is indicated at 4, in advance of the forward bulkhead 5, said leading edge being provided with one or more vertical slots 6, depending upon the number of guns to be installed. In this example, with three motors 7, each having a propeller 8, two slots 6 are provided, each to receive the barrel 9 of a gun 10, so that fire may be directed between each pair of propeller disks.

In Fig. 2 appears an enlarged detail of a gun mounted in the airfoil leading edge with a gunner seated therein and the gun barrel projecting through a slot.

The gun is mounted on a horizontal pivot 11, carried by a bracket 12 which itself is provided with a vertical pivotal bearing 13 that is carried by a cross member 14, said cross member having arms attached thereto at its opposite ends. These arms have the curved portions 15 and straight portions 16, the straight portions being telescopic in tubes 17 that are pivoted horizontally at 18 in fittings 19 which are attached to the bulkhead 5.

The tubes 17 are spaced apart sufficiently to enable the gunner, seated on stool 20, to be positioned therebetween, for gun operating convenience, and the arm portions 15 are bowed for convergence toward the cross member to which they are attached.

Springs 21, located in tubes 17, serve to urge the arms, and hence the gun mount into close relation with the inner surface of the leading edge portion, whose contour has to be followed

in the vertical movement of the gun. Also spring or other suitable means, indicated at 22, serve as a counterweight for the gun.

The slot edges are channelled, or provided with guideways, to slidably contain a flexible cover member 23 that may be transparent, said cover member, which serves as a radius arm carriage, having an opening 24 to receive the gun barrel which is projected therethrough. As illustrated the cover member appears in the form of an articulated band, the members thereof, which may be of glass or other transparent material, being interengaged, and the barrel receiving member 25 being provided with antifriction bearings to facilitate movement in the guideways. Also, at opposite sides of the slot the leading edge may be provided with windows 26, for gunner's vision.

Variations within the spirit and scope of my invention are equally comprehended by the foregoing disclosure.

I claim:

1. In an airplane having a lifting type fuselage, said fuselage having a hollow leading edge portion provided with a vertical slot, a cover member for said slot that is slidable therein, a carriage forming a part of said cover, a telescopic gun mount in the form of a radius arm, that is pivotally supported in said leading edge portion, tensional means forcing said telescopic arm to extended position with the gun mount abutting the carriage, and a gun supported by said mount, the barrel of said gun projecting through said slot to be movable with said carriage whereby the gun mount follows the contour of said leading edge in its operation.

2. In an airplane having a lifting type fuselage, said fuselage having a hollow leading edge portion provided with a vertical slot, a cover member for said slot that is slidable therein, a carriage forming a part of said cover member, a gun mount in the form of a radius arm, comprising a fixed pivotal portion, a reciprocable portion and tensional means to extend said reciprocable portion, and a gun pivotally supported by said reciprocable portion, the barrel of said gun projecting through said slot to be movable with said carriage and said tensional means forcing said gun mount against said carriage whereby said gun mount follows the contour of the leading edge in its operation.

3. The combination of an airplane having a lifting type fuselage and a plurality of motors with spaced apart propellers operated thereby in the same vertical plane in advance of said fuselage, said fuselage having a hollow leading edge portion that is provided with a vertical slot between said propellers, a cover for said slot that is slidable therein, a carriage forming part of said cover, a telescopic gun mount in the form of a radius arm, a horizontal pivotal means supporting said mount in said leading edge portion, a gun whose barrel is projected through said carriage in line with the space separating said propellers, resilient means operative to extend said telescopic arm to force the gun mount to abut said carriage whereby said gun mount follows the contour of said leading edge, in its operation, and pivotal joint means connecting said gun and its mount to permit said gun to be swung both vertically and horizontally.

4. In an airplane having a lifting type fuselage, said fuselage having a hollow leading edge portion provided with a vertical slot, a cover member for said slot that is slidable therein, a carriage forming part of said cover, a telescopic gun mount in the form of a radius arm, that is pivotally supported in said leading edge portion, means automatically operative to force said telescopic arm to extended position with the gun mount abutting the carriage, and a gun supported by said mount, the barrel of said gun projecting through said slot to be movable with said carriage whereby the gun mount follows the contour of said leading edge in its operation.

5. The combination of an airplane having a lifting type fuselage and a plurality of motors with spaced apart propellers operated thereby in the same vertical plane in advance of said fuselage, said fuselage having a hollow leading edge portion that is provided with a vertical slot, between said propellers, a cover for said slot that is slidable therein, a carriage forming part of said cover, a telescopic gun mount in the form of a radius arm, a horizontal pivotal means supporting said mount in said leading edge portion, a gun whose barrel is projected through said carriage in line with the space separating said propellers, and means automatically operative to extend said telescopic arm to force the gun mount to abut said carriage whereby said gun mount follows the contour of said leading edge, in its operation, and pivotal joint means connecting said gun and its mounts to permit said gun to be swung both vertically and horizontally.

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